REMARKS/ARGUMENTS

STATUS OF CLAIMS

Applicant has amended Claims 20, 24, and 28. Applicant respectfully requests reconsideration of pending Claims 20-35 and 87 in light of the following remarks.

CLAIM REJECTIONS – 35 U.S.C. §102

Independent Claim 20

Claim 20 stands rejected under 35 U.S.C. § 102(b) as being anticipated by United States Patent No. 6,481,973 issued to Struthers (hereinafter "Struthers"). Claim 20 specifies "measuring a DC bus current being provided to the motor as an AC current by at least one drive" and "determining whether the DC bus current is greater than a limp current limit setting."

Struthers discloses a method of operating a variable speed submersible pump 10. The pump 10 includes a motor 12, a power module 16 including a rectifier 28, a controller 22, a microprocessor 24, an inverter 30, a DC link 32, and sensors 42. The pump 10 uses the sensors 42 to monitor the speed and torque of the motor 12. The sensors 42 monitor the outputs of the inverter 30, which are AC signals, but the sensors 42 do not monitor the DC link 32. In other words, the sensors 42 do not measure a DC bus current (*i.e.*, the DC link 32 current), as specified by Claim 20. Also, Struthers discloses that the pump 10 enters a recovery mode when the pump 10 becomes clogged. The controller 22 can only determine that the pump 10 is clogged "by detecting that the motor 12 is developing an unacceptably high torque," presumably by using torque determinations made by inputs from the sensors 42 monitoring the AC outputs of the inverter 32. However, Struthers does not disclose entering the recovery mode based on the DC link 32 current, as specified by Claim 20. In addition, Struthers discloses that the control board 22 may monitor "the minimum, average, and maximum operating current of the motor 12." The control board 22 monitors this data so that it may be provided to a portable tester plugged into a data port on the pump 10. However, Struthers does not disclose using this data to control the

operation of the pump 10. *Struthers*, col. 3, lines 1-47; col. 5, lines 18-30; col. 7, line 60 to col. 8, line 2, col. 9, lines 22-47; and Fig. 2.

Accordingly, Struthers does not disclose "measuring a DC bus current being provided to the motor as an AC current by at least one drive" and "determining whether the DC bus current is greater than a limp current limit setting," as specified by Claim 20. Thus, independent Claim 20 and dependent claims 21-23 are allowable.

Dependent Claims 21-23

Claims 21-23 stand rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claims 21-23 depend from independent Claim 20 and are therefore allowable for the reasons set forth above with respect to Claim 20. Claims 21-23 also include additional patentable subject matter not specifically discussed herein.

Independent Claim 24

Claim 24 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Struthers. Claim 24 specifies "measuring a DC bus voltage being provided to the motor as an AC voltage by at least one drive" and "determining whether the DC bus voltage is less than a programmed threshold."

Struthers discloses that the pump 10 uses sensors 42 to monitor the speed and torque of the motor 12. The sensors 42 monitor the outputs of the inverter 30, which are AC signals, but the sensors 42 do not monitor the DC link 32. In other words, the sensors 42 do not measure a DC bus voltage (*i.e.*, the DC link 32 voltage), as specified by Claim 24. Also, Struthers discloses the pump 10 entering a recovery mode when the pump 10 becomes clogged. The controller 22 can only determine that the pump 10 is clogged "by detecting that the motor 12 is developing an unacceptably high torque," presumably by using torque determinations made by inputs from the sensors 42 monitoring the AC outputs of the inverter 32. However, Struthers does not disclose entering the recovery mode based on the DC link 32 voltage, as specified by Claim 24.

Accordingly, Struthers does not disclose "measuring a DC bus voltage being provided to the motor as an AC voltage by at least one drive" and "determining whether the DC bus voltage is less than a programmed threshold," as specified by Claim 24. Thus, independent Claim 24 and dependent claims 25-27 are allowable.

Dependent Claims 25-27

Claims 25-27 stand rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claims 25-27 depend from independent Claim 24 and are therefore allowable for the reasons set forth above with respect to Claim 24. Claims 25-27 also include additional patentable subject matter not specifically discussed herein.

Independent Claim 28

Claim 28 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Struthers. Claim 28 specifies "measuring an AC line current; determining whether the AC line current is greater than a programmed threshold;" and "reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the AC line current is less than the programmed threshold in order to drive the motor in a limp mode."

Struthers discloses that the pump 10 uses sensors 42 to monitor the speed and torque of the motor 12. The sensors 42 monitor the outputs of the inverter 30 which are AC signals. However, the sensors 42 do not measure an AC line current (*i.e.*, AC line 34 current). Also, Struthers discloses the pump 10 entering a recovery mode when the pump 10 becomes clogged. The controller 22 can only determine that the pump 10 is clogged "by detecting that the motor 12 is developing an unacceptably high torque," presumably by using torque determinations made by inputs from the sensors 42 monitoring the AC outputs of the inverter 32, but not an AC line current as specified by Claim 28. In addition, Struthers does disclose monitoring a power supply voltage to determine if the voltage is too high or low for the inverter 30 or the motor 12. However, Struthers does not disclose how this information is used. *Struthers*, col. 3, lines 1-47;

col. 5, lines 18-30; col. 6, lines 59-61; col. 7, line 60 to col. 8, line 2, col. 9, lines 22-47; and Fig. 2.

Accordingly, Struthers does not disclose "measuring an AC line current; determining whether the AC line current is greater than a programmed threshold;" and "reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the AC line current is less than the programmed threshold in order to drive the motor in a limp mode" as specified by Claim 28. Thus, independent Claim 28 and dependent Claims 29-31 are allowable.

Dependent Claims 29-31

Claims 29-31 stand rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claims 29-31 depend from independent Claim 28 and are therefore allowable for the reasons set forth above with respect to Claim 28. Claims 29-31 also include additional patentable subject matter not specifically discussed herein.

Independent Claim 32

Claim 32 stands rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claim 32 specifies "reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the temperature is greater than the limp temperature limit setting in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode."

Struthers discloses a temperature sensor for detecting if the motor 12 is overheating. In Struthers, if the controller 22 detects that the pump 10 is overheating, the controller 22 immediately stops the pump 10. At no time does the pump 10 of Struthers enter a "limp mode" based on a temperature being greater than a temperature limit. *Struthers*, col. 6, lines 15-17; col. 7, lines 41-43; Figs. 5A and 5B.

Accordingly, Struthers does not disclose "reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the temperature is greater than

the limp temperature limit setting in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode," as specified by Claim 32. Thus, independent Claim 32 and dependent Claims 33-35 are allowable.

Dependent Claims 33-35

Claims 33-35 stand rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claims 33-35 depend from independent Claim 32 and are therefore allowable for the reasons set forth above with respect to Claim 32. Claims 33-35 also include additional patentable subject matter not specifically discussed herein.

Independent Claim 87

Claim 87 stands rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claim 87 specifies "measuring a parameter including at least one of an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, and a speed of the motor; determining if the parameter is outside of a range; executing a recovery operation if the parameter is outside of a range" and "shutting down the motor if the recovery operation fails."

Struthers discloses executing a recovery operation if the pump 10 is "clogged," which results in shutting down the motor 12 if the recovery operation fails. The controller 22 can only detect a clog only when the motor 12 develops "an unacceptably high torque." In other words, Struthers only discloses executing a recovery operation when the controller 22 detects an unacceptably high torque. *Struthers*, col. 3, lines 1-13; col. 7, line 60 to col. 8, line 61; Figs. 5A and 5B. Struthers does not disclose executing a recovery operation by the controller 22 detecting any one of the parameters specified by Claim 87, namely an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, or a speed of the motor.

Accordingly, Struthers does not disclose "measuring a parameter including at least one of an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, and a speed of the motor; determining if the parameter is outside of a range; executing a recovery

operation if the parameter is outside of a range" and "shutting down the motor if the recovery operation fails," as specified by Claim 87. Thus, independent Claim 87 is allowable.

CONCLUSION

In view of the above, Applicant respectfully requests entry of the amendment and allowance of pending Claims 20-35 and 87.

Respectfully submitted,

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